CHAPTER 13

SPECIAL ROOFINGS

Section I. ELASTOMERIC ROOFING

13.1.1 Description and General Discussion

Elastomeric roofing is a comparatively recent development which is being increasingly used for special applications. There are two types, namely the fluid applied system and the sheet applied system. The fluid applied system is comprised of multiple coats of elastomeric materials applied to suitable, dry, smooth substrates. The sheet applied system involves application of elastic sheet material directly to the deck or to a coated base sheet with either hot asphalt or manufacturer's adhesive.

13.1.2 Use of Elastomeric Roofing

An advantage of elastomeric roofing is that it may be readily applied to roofs or surfaces with irregular or warped shapes on which it is not feasible to use conventional roofing materials. Elastomeric roofing is also light in weight and is reflective. However, because of the high cost and the limited experience factor, the use of elastomeric roofing on military structures must be fully justified. Elastomeric roofing must be applied only by experienced personnel and strictly in accordance with the manufacturer's instruction. Compatibility of the fluid applied elastomeric roofings with the existing surface must be verified. In repair work, elastomeric roofing may sometimes be used to advantage in problem areas where other roofings or methods have proved unsatisfactory or impractical, and additional cost can be justified. Military guide specifications covering the installation of elastomeric roofing are available.

Section II. BARE CONCRETE ROOFS — TROPICAL AREAS

Exposed concrete slabs have, by themselves, performed satisfactorily as roofings in the tropics. A major area of concern in such roofs is the proper treatment of joints and cracks. In the case of the precast roofing, it is the treatment of interpanel joints; in the case of the poured-in-place concrete slabs, it is the treatment of construction joints and cracks which occur as the result of shrinkage, thermal or structural movement, etc. Experience indicates that cracks and joints may be effectively waterproofed by covering the crack or joint with a reinforcing fabric embedded in a suitable bituminous material such as roofing cement. A "bondbreaker" consisting of a 2-inch wide strip of plastic sheeting, paper, or other material, should be placed dry over the crack or joint to prevent a stress concentration at that point. Joint sealants (such as TT-S-227 or TT-S-230 show promise for panel joints. Concrete surfaces to be in contact with the sealant must be clean. A "bondbreaker" should be placed at the base of the joint to insure a proper shape factor (ratio of width of joint to thickness of sealant). For a discussion of "shape factor" see Department of the Army TM 5-805-6 (Department of the Air Force AFM 88-4, Chapter 4), November 1965, entitled "Calking and Sealing." If the number of cracks and joints in a concrete roof deck become excessive and maintenance becomes uneconomical, it will be necessary to apply a membrane type roofing.

Section III. ROOFING IN ARCTIC AREAS

13.3.1 General

The low temperatures experienced in arctic areas for prolonged periods cause problems with roofing. Application of roofing, particularly built-up types, is difficult and can only be accomplished during the summer months. The low temperatures affect the roofing itself. Perhaps the greatest problem is that caused by the temperature differential between the interior and exterior of the building. This difference can be 120°F or more when outside temperatures reach -40°to -75° F. With this temperature difference moisture vapor tends to migrate to the outside (lower temperature), and will condense and freeze within the roof construction (insulations) if precautions are not taken. The temperature differential between summer and winter, resulting in contraction or expansion of the roofing membrane, also constitutes a problem.

13.3.2 Vapor Barrier

The provision of an adequate vapor barrier is of vital importance in roof construction in the arctic. The vapor barrier must be applied on the warm (room side), be of low permeance to restrict the flow of water vapor, and be continuous. It is preferable that the vapor barrier and insulation be placed below the roof deck rather than between the roofing and the deck. Lack of a vapor barrier will result in a buildup of ice within the roof construction and lead to premature failure.

13.3.3 Roof Slope

Positive drainage should be provided for roofs in arctic areas. Built-up roof should have a slope of at least 1 inch per foot. For roofs of limited width, repair measures may include the provision of a new sloped deck above the existing flat (deal level) deck. This method has the added advantage of providing a vented air space between the insulation and the roofings which allows dissipation of water vapor.

13.3.4 Sheet Metal Eaves Flashing (Strip Shingles)

Asphalt strip shingle roofing on roof decks with slope of 4 inches per foot or more generally perform well in cold areas. However, wherever there is a possibility of ice forming along the eaves and causing a backup of water, a double cemented felt underlay should be provided over the eaves and extend to a line 24 inches beyond the inside face of the exterior wall. If there is danger of glaciation and ice damage at roof eaves requiring omission of gutters, a metal eaves flashing should be provided. This sheet metal should not be coated or treated in a way which would restrict ice slippage.

13.3.5 Provision for Expansion and Contraction

Allowance should be made for contraction of built-up roofs which are applied during the summer and then subjected to extremely low winter temperatures. Such contraction can cause splitting of felts. Additional expansion joints should be provided. Since glass fiber felts contract more than organic felts, their use should be avoided in arctic areas.